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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics



THE REDUCED FEED SUPPLY AND ITS RELATION
TO THE LIVESTOCK OUTLOOK

Washington, D. C.
December, 1930.

THE REDUCED FEED SUPPLY AND ITS RELATION TO THE LIVESTOCK OUTLOOK

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The widespread drought of 1930 which was the most severe period of dry weather in 29 years has resulted in a material reduction in the supply of feed for livestock. Effects of this feed shortage, on the livestock industry may be felt not only during the remainder of 1930, but in 1931 and 1932 as well. The feed grain supply is reduced to a level about 12 per cent below the average for the preceding five years, and the hay supply is reduced to about 9 per cent below the 5-year average. The severe drought of 1901 made a similar reduction in the feed supply. The effect of that drought upon livestock production and marketing during the two years following may give some indication of the effect of the present drought upon production and marketings in 1931 and 1932.

Hog production was curtailed in 1901 and 1902 and marketings were materially reduced in 1902 and 1903. An abnormal distribution of hog marketings occurred during the winter of 1901-02, a larger-than-usual proportion being marketed during the early winter. The average live weights of hogs marketed were much below normal during the winter and spring months. The upward trend in cattle production which was under way at that time apparently was not affected by the feed shortage. Feeding operations were affected, however, and a relatively small market supply of finished cattle during the summer and early fall of 1902 was largely responsible for the sharp advance in beef steer prices during that period. The effects on the sheep industry were not so pronounced, but a reduction in marketings and a greater-than-usual advance in lamb prices from January to April in 1902 was apparently due to curtailed winter feeding operations. A shortage of feed for livestock also occurred in 1924-25 as a result of the short corn crop of 1924. Although the 1924-25 feed situation was not so acute as that of 1901-02, the effects on the livestock industries were quite similar to those of the earlier period.

The effects of reduced crop production in 1901 and 1924 on subsequent livestock supplies and prices were largely a result of the reduced feed supplies being reflected in materially higher feed prices during the years (beginning November 1) of 1901-02 and 1924-25. Quite a different situation has prevailed thus far in the present season. Feed prices are at a relatively low level despite reduced supplies of hay and feed grains, and wheat prices are low enough to permit the feeding of wheat to advantage. As an apparent result of the recent relationship of feed prices to livestock prices, evidence of an increased interest in livestock feeding has developed since early October. The duration of the present feed-livestock price relationships will largely govern to what extent the usual trends of livestock marketing and prices following years of materially reduced crop production will reoccur in 1931 and 1932.

In making comparisons of the present situation with previous periods of drought or feed shortage it is necessary to study the changes which have occurred in the supply of feed and numbers of livestock during the past 30 years. Marked changes in our livestock supply from year to year and over a period of years must be given consideration in any attempt to adjudge the effects of reduced crop production on the livestock industry. In order to illustrate the extent of the feed shortage in relation to livestock numbers, there are presented in Figures 1, 2, 3 and 4 the changes in the apparent consumption (disappearance) of feed and in livestock numbers, expressed in animal units, from 1897 to date. 1/ It will be noted in Figures 1 and 3 that

1/ Estimates of the numbers of livestock on January 1 were used as the basis for computing animal units. The estimates for each kind of livestock were weighted as follows:

1. Milk cows = 1.00 animal unit
2. Other cattle = .76 " " - 1900
 .73 " " - 1910
 .715 " " - 1920
 .70 " " - 1930

Interpolations were made for intervening years. The animal unit factors for other cattle were computed from Census data adjusted to a January 1 basis and using the following values:

- | | | | |
|--|---|-----|-------------|
| Beef cows and heifers, 2 years and older | = | 1.0 | animal unit |
| Steers and bulls, 1 year and older | = | .9 | " " |
| Heifers 1 to 2 years | = | .7 | " " |
| Calves under 1 year | = | .4 | " " |
3. Horses and mules = 1.00 animal unit
 4. Sheep and lambs = .12 " "
 5. Hogs, including pigs = .15 " "

Adjustments were made for numbers of horses not on farms and net exports of cattle because of the marked downward trend in both since 1900.

there has been a marked upward trend in apparent feed consumption per animal unit since 1897. Figures 2 and 4 indicate that this upward trend has come about through an upward trend in feed production and a rather stable supply of livestock during the first half of the period and through a more stable level of crop production and a marked downward trend in livestock production during the last half of the period. Even though our present feed situation appears quite serious it is fortunate for livestock producers that the drought occurred at a time when the livestock supply was near the lowest level in 30 years.

Disappearance of feed was computed from data on production, carry-over and net exports. Corn, oats, and barley were used to represent grain feed and both tame and wild hay were included in the calculations of hay disappearance. It will be noted that the feed production of one year is used in the calculation of feed disappearance the year following. Hence, 1929 production plus November 1, 1929 carryover minus 1930 net exports minus November 1, 1930 carryover equals 1930 disappearance.

November 1 estimates of 1930 crop production were used in estimating disappearance for 1931. In estimating feed disappearance per animal unit for 1931 it was assumed that the number of animal units on January 1, 1931 would be the same as that of January 1, 1930.

More intensive feeding and a smaller proportional use of feeds other than those included in these computations account for much of the upward trend in feed consumption per animal unit as indicated by Figures 1 and 3. In the earlier part of the period beef cattle were kept to an older age before being sent to slaughter and a much larger percentage of the feed consumed by such cattle consisted of pasture and "waste" feed. The expansion of the dairy industry has been accompanied by more intensive feeding practices. There has also been a tendency toward a greater use of grain feeds per animal unit in sheep and swine production, even though to a smaller degree than in the beef and dairy cattle industries.

The downward trend in the number of animal units since 1918 is largely a result of a marked decline in horse and cattle production. If cyclical tendencies in cattle production prevail during the next five or six years as they have in the past, an increase in cattle production will occur, which will tend to prevent the long time upward trend in feed production per animal unit from being maintained during this period.

The most outstanding season of feed shortage was in 1901-02 which was a result of the drought of 1901. The corn crop, amounting to 1,614,000,000 bushels, was 32 per cent smaller than the average production of the previous five years. A reduced supply was not so important then as it is now, however, since a larger proportion of the crop was normally exported during the earlier years. The yearly net exports averaged 192,000,000 bushels during the five years, 1896 to 1900, whereas during the past five years they averaged only 22,000,000 bushels. The short corn crop of 1901 reduced net exports for the year beginning November 1, 1901 to 28,000,000 bushels. Oats production in 1901 was 9 per cent below the average of the previous five years but barley production was 18 per cent above the 5-year level.

The short corn crop of 1924 resulted in a feed shortage during the feeding season of 1924-25, but it was not so acute as that of 1901-02. The feed situation of 1930-31 is more comparable to that of 1901-02 than that of 1924-25, but since the latter is a more recent period, and the effects on livestock marketing and prices were quite similar to those of 1901-02, it is included in the comparisons to follow. These feeding seasons will be referred to as the years of 1902, 1925 and 1931. The apparent consumption of feed grains per animal unit in 1902 was 76 per cent of the 5-year average 1897 to 1901 as compared with 95 per cent of the 5-year average 1920 to 1924 in 1925, and an estimated supply of 86 per cent of the 5-year average 1926 to 1930 in 1931. Percentage comparisons, on the same basis, of hay consumption per animal unit show 90 per cent for 1902, 112 per cent for 1925 and 91 per cent for 1931.

Table 1.- Apparent feed consumption per animal unit during years of short feed supplies

Period	Feed grains:		Hay
	Pounds	Short tons	
1901-02, (year of short feed)....	1431.2:	.6983	
Previous 5-year average, 1896-97 to 1900-01.....	1876.2:	.7775	
	Per cent	Per cent	
1901-02 as a percentage of previous 5-year average.....	76.3:	89.8	
	Pounds	Short tons	
1924-25 (year of short feed)....	2141.6:	1.3955	
Previous 5-year average, 1919-20 to 1923-24.....	2258.1:	1.2498	
	Per cent	Per cent	
1924-25 as a percentage of previous 5-year average.....	94.8:	111.7	
	Pounds	Short tons	
1930-31 (year of short feed)..... ^{1/}	2205.3	^{1/} 1.3470	
Previous 5-year average, 1925-26 to 1929-30.....	2515.1:	1.4742	
	Per cent	Per cent	
1930-31 as a percentage of previous 5-year average.....	87.7	91.4	

^{1/} See Footnote ^{1/}, p. 2 for method used in making estimates.

The data in Table 1 show that the feed supply per animal unit for 1931 is estimated to be approximately equal to the apparent consumption in 1925, but when expressed as a percentage of the average of the preceding five years the figures for 1931 are considerably smaller as a result of the upward trend of

recent years. The supply of feeds other than those included in the above comparisons are somewhat different from what they were in 1902 and 1925. Pasture conditions since the first of July have been much poorer than they were in 1924 and as a result a large proportion of the supply of grain and hay feeds probably will be consumed before the end of the year than was consumed in the same period in 1924. Also, the present relatively low wheat prices tend to encourage the feeding of wheat to a greater extent than in previous years. It has been estimated that about 92,000,000 bushels were fed and wasted from July 1, 1901 to June 30, 1902, and about 66,000,000 bushels during the corresponding period in 1924-25. 1/

1/ Food Research Institute, "Wheat Studies", Vol. 4, No. 4.

About 236,000,000 bushels of wheat will be fed during the present crop year if the intentions of farmers, feed manufacturers, and commercial poultrymen are carried out as expressed on November 15 in answer to a survey made by this Bureau. Such an increased use of wheat for feed would amount to about 105 pounds per animal unit over that estimate of the amount fed in 1901-02 and 125 pounds per animal unit over that of 1924-25. The extent to which farmers and others will carry out their expressed intentions to feed wheat will be determined by the relationship of wheat prices to the prices of feed grains during the remainder of the season.

It is also to be noted that in the previous periods of short feed supplies feed grain prices during the fall and winter were high relative to livestock prices; and feeding operations were curtailed. The situation has been quite different thus far this year. A decline in feed prices during the past two months has stimulated feeding. A smaller proportion of the hog supply is being marketed and weights are heavier than would be expected, considering the feed supply alone. An increased interest in cattle feeding also has developed during the past few weeks. The extent to which these feeding tendencies continue and thereby prevent the reoccurrence in 1931 and 1932 of the usual trends of livestock marketing and prices following years of materially reduced crop production depends upon the duration of the present feed-livestock price relationship.

A study of the similarity in changes in production, marketings, and in prices of livestock during the following previous periods of reduced feed supplies is of value in analyzing the probable effects of the present feed situation. In making these comparisons for each class of livestock it is recognized that many factors prevent the periods from being entirely comparable with each other or with the present period, and that even though certain tendencies may prevail as a result of the relation of the feed supply to livestock it is quite possible that other influences may more than offset these tendencies.

The drought of 1901 came at a time when cattle production was on an upward swing similar to our position in the cycle in 1913 and in 1930. The short corn crop in 1913 reduced the feed supply of 1914 below normal although the shortage was not so marked as in some of the other pre-war years, but since the shortage that year was due principally to a reduced corn supply and the position in the cattle cycle was similar to the position in both 1901 and 1930 it is included in the following comparison of the trend of cattle numbers:

Table 2.- Cattle: Number on farms January 1, 1900-1903, 1912-1915
and 1929-1930

Year	Cattle	Year	Cattle	Year	Cattle
	Number		Number		Number
1900	37,518	1912.....	55,022	1929.....	56,467
1901	60,544	1913.....	55,833	1930.....	57,967
1902	62,215	1914.....	58,737	1931.....	
1903	63,768	1915.....	62,532	1932.....	

In neither of these two earlier periods of feed shortage was the upward trend of cattle production materially affected. There has been little evidence of forced marketing of cattle this year as a result of the drought and available data for 1901 indicates that there was no appreciable forced movement during that period. Cattle production is expected to show another increase on January 1, 1931. Figure 5 shows that beef cattle prices in 1902, 1914 and 1925 were higher than during the preceding years and in 1902 and 1914 they reached the peak of a cattle price cycle. In order to illustrate the similarity of the seasonal movement in prices during those years, Figure 5 represents the average price of beef steers at Chicago from July of the years of short production to December of the following year. Price made little change from each July to the following February and steady and material advance occurred from February to the late summer months. The advance was not so marked in 1914 which may have been due to the less severe shortage of feed and a marked decline in business activity in that year. Market records and reports show that there was a relatively small market supply of well finished cattle during those years.

Hog prices in 1901 were on the upward trend of a price cycle which began in 1899, while 1924 marked the beginning of an upward trend in price cycle. Hog numbers on farms on January 1 are estimated at 53,200,000 head in 1901, 66,361,000 in 1924 and 52,600,000 in 1930. The relative profitableness of hog production as indicated by the corn-hog ratio, and the change in marketings during the three years following each of these two years of short crop production are shown in the following Table:

Table 3.- Marketings of hogs and corn-hog ratio, 1901-1904 and 1924-1927

Year	Marketings	Corn-hog	Year	Marketings	Corn-hog
	1/	ratio 2/		3/	ratio 4/
	Thousands	Bushels		Thousands	Bushels
1901.....	31,129	12.0	1924.....	52,873	8.2
1902.....	26,375	11.5	1925.....	43,043	11.3
1903.....	26,971	13.0	1926.....	40,636	16.9
1904.....	30,072	10.2	1927.....	43,633	12.7

- 1/ Commercial hog slaughter. 2/ Price of heavy hogs and No.2 Yellow corn at Chicago.
3/ Slaughter under Federal inspection. 4/ Farm price of hogs and corn in the United States.

In 1902 and 1925 the ratios were about normal. Prices of both corn and hogs were higher. In 1903 and 1926 materially higher ratios prevailed and this more favorable condition was apparently responsible for the increase in hog production which followed. Largely as a result of the increased market supply of hogs, the corn-hog ratio declined sharply in 1904 and 1927. A relatively small number of hogs were marketed in 1902 and 1903 and in 1925 and 1926, but an increase in marketings occurred in 1904 and 1927. If these conditions are repeated as a result of the present feed situation, a relatively small number of hogs will be marketed in 1931 and 1932, but an increase in marketings will occur in 1933; the corn-hog ratio in 1931 will not be far from normal, but in 1932 it will be unusually favorable for hog producers.

The distribution of hog marketings from October to April of 1901-02 and 1924-25 was apparently affected by the feed situation in both periods. There was a marked falling off in sales in late winter and early spring and an unusually large number were marketed from November to January. The proportion of October to April marketings occurring from February to April in 1902 was 94 per cent of the 1896-97 to 1900-01 average and in 1925 it was 85 per cent of the 1919-20 to 1923-24 average. The proportion of October to April marketings occurring from November to January was 108 per cent in 1901-02 and 112 per cent in 1924-25 of the respective 5-year averages. The scarcity of feed apparently resulted in bunched marketings of light weight and under-finished hogs during the early winter, thereby reducing supplies for the remainder of the winter season. Table 4 indicates that average weights were below normal until mid-summer.

Table 4.- Hogs: average live weight at Chicago, 1901-02 and 1924-25 compared with previous 5-year average

	:	:5-year	:1901-02	::	:5-year	:1924-25			
	:	:average	:as per-	::	:average	: as per-			
	:	:1896-97	:centage	::	:1919-20	:centage of			
	:	: to	:of pre-	::	: to	:previous			
Month	:	1901-02	:1900-01	:	1924-25	:1923-24			
	:	:	:vious 5-	::	:	:5-year			
	:	:	:year aver-	::	:	:average			
	:	:	: age	::	:	:			
	:	<u>Pounds</u>	<u>Pounds</u>	:	<u>Pounds</u>	<u>Pounds</u>			
	:		<u>Per cent</u>	:		<u>Per cent</u>			
Oct.....:	236	:	241	:	235	:	243	:	96.7
Nov.....:	218	:	244	:	220	:	230	:	95.7
Dec.....:	202	:	244	:	214	:	229	:	93.4
Jan.....:	203	:	233	:	220	:	234	:	94.0
Feb.....:	208	:	228	:	222	:	236	:	94.1
Mar.....:	216	:	225	:	229	:	243	:	94.2
Apr.....:	214	:	228	:	235	:	245	:	95.9
May	219	:	230	:	236	:	242	:	97.5
June	223	:	233	:	238	:	243	:	97.9
July	230	:	234	:	249	:	252	:	98.8
	:	:	:	:	:	:	:	:	:

The effects of feed shortages on the sheep industry have been less marked than on the cattle and hog industries. Such might be expected, since the bulk of our sheep population is in the Western States where producers are constantly confronted with the hazards of low rainfall. Sheep, being good scavengers are more easily carried through periods of scant feed supplies than are most kinds of livestock. The most noticeable effects have been on lamb feeding operations. During the first four months of 1902, lamb prices made more than the usual seasonal advance. Apparently a smaller-than-usual proportion of the lamb crop was grain fed during the winter, thereby reducing market supplies from January to April. A greater than usual seasonal price advance also occurred during these months in 1917 and 1920 (years of reduced feed supplies, but not so severe as in 1902). In 1925 it appears that the extent of feeding was not materially affected, and marketings during the fed lamb marketing season were in about normal proportion to the total marketings for the crop year. Profitableness of the preceding year's feeding operations is an important factor affecting the extent of lamb feeding. The favorable feeding margin of the 1923-24 season may have prevented a reduction in lamb feeding in the winter of 1924-25.

The 1930-31 lamb feeding season is following one of the most unfavorable feeding seasons on record as well as being faced with the sharp reduction in national feed supplies. In parts of the lamb feeding area, however, feed supplies are relatively much larger than they are for the country as a whole.

Table 5. - Hay and feed grains: Disappearance total, per animal unit and five year moving average, and number of animal units, 1897-1931

Calendar year	Hay				Feed grains 1/			
	Disappearance				Disappearance			
	Per animal unit		Number		Per animal unit		Number	
	Total	Annual	5-year	of	Total	Annual	5-year	of
			moving	animal			moving	animal
			average	unit			average	units
	1,000	Short	Short	Thou-	Million			Thou-
	sh. tons	tons	tons	sands	pounds	Pounds	Pounds	sands
1897.....	54,445	.7536		:72,245	159,368	200.2		:79,525
1898.....	58,791	.8065		:72,898	145,720	1801.4		:80,893
1899.....	66,722	.9007	.7786	:74,076	148,216	1801.2	1874.9	:81,876
1900.....	57,530	.7550	.7678	:76,199	159,864	1898.8	1760.7	:84,089
1901.....	53,291	.7774	.7685	:76,670	162,096	1870.7	1798.6	:86,650
1902.....	55,701	.6983	.7573	:73,765	124,208	1431.2	1816.2	:86,785
1903.....	65,567	.8112	.7777	:80,830	175,048	1991.2	1832.9	:87,910
1904.....	68,214	.8447	.8215	:80,752	166,592	1889.3	1872.0	:88,177
1905.....	69,169	.8571	.8431	:80,701	175,320	1982.1	2023.9	:88,451
1906.....	72,971	.8962	.8573	:81,419	185,144	2066.1	2011.6	:89,609
1907.....	66,344	.8065	.8796	:82,261	199,032	2190.6	2023.4	:90,856
1908.....	72,186	.8820	.9241	:81,848	175,696	1929.8	2038.1	:91,043
1909.....	78,373	.9561	.9521	:81,969	176,352	1948.5	2085.8	:90,519
1910.....	87,262	1.0738	.9747	:80,614	181,528	2055.5	2064.4	:88,315
1911.....	82,675	1.0361	1.0084	:79,794	203,168	2304.8	2182.2	:88,149
1912.....	72,277	.9197	1.0218	:78,590	181,120	2063.2	2211.3	:86,945
1913.....	83,050	1.0502	1.0147	:79,078	219,564	2518.8	2208.0	:87,178
1914.....	83,206	1.0231	1.0470	:81,328	186,600	2094.3	2208.6	:89,098
1915.....	87,425	1.0444	1.1183	:83,710	188,096	2038.8	2185.1	:92,260
1916.....	103,456	1.1978	1.1311	:86,371	220,016	2308.0	2124.6	:95,326
1917.....	112,754	1.2760	1.1381	:88,368	190,416	1965.6	2105.9	:96,673
1918.....	100,048	1.1143	1.1660	:89,782	219,328	2216.3	2106.6	:96,962
1919.....	94,335	1.0581	1.1590	:89,153	197,536	2000.9	2113.0	:98,725
1920.....	103,435	1.1836	1.1558	:87,393	196,936	2043.2	2173.4	:96,387
1921.....	98,863	1.1630	1.1972	:85,006	219,408	2339.2	2177.6	:93,796
1922.....	105,984	1.2600	1.2513	:84,111	210,968	2267.4	2260.2	:93,045
1923.....	109,451	1.3214	1.2937	:82,832	208,504	2237.4	2279.9	:93,189
1924.....	107,534	1.3285	1.3312	:80,941	219,400	2413.8	2312.4	:90,695
1925.....	109,414	1.3955	1.3421	:78,403	185,760	2141.6	2354.9	:86,738
1926.....	102,711	1.3507	1.3990	:76,042	209,352	2501.7	2413.3	:83,684
1927.....	96,615	1.3143	1.4453	:73,513	202,688	2479.9	2454.5	:81,731
1928.....	116,244	1.6060	1.4757	:72,380	206,096	2529.6	2515.2	:81,473
1929.....	113,029	1.5598	1.4750	:72,462	212,200	2619.9	2456.0	:80,994
1930.....	113,301	1.5479		:73,196	198,264	2445.1		:81,066
1931.....	98,597	1.3470		:73,196	178,824	2205.3		:81,086

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1/ Feed grains include corn, oats and barley.

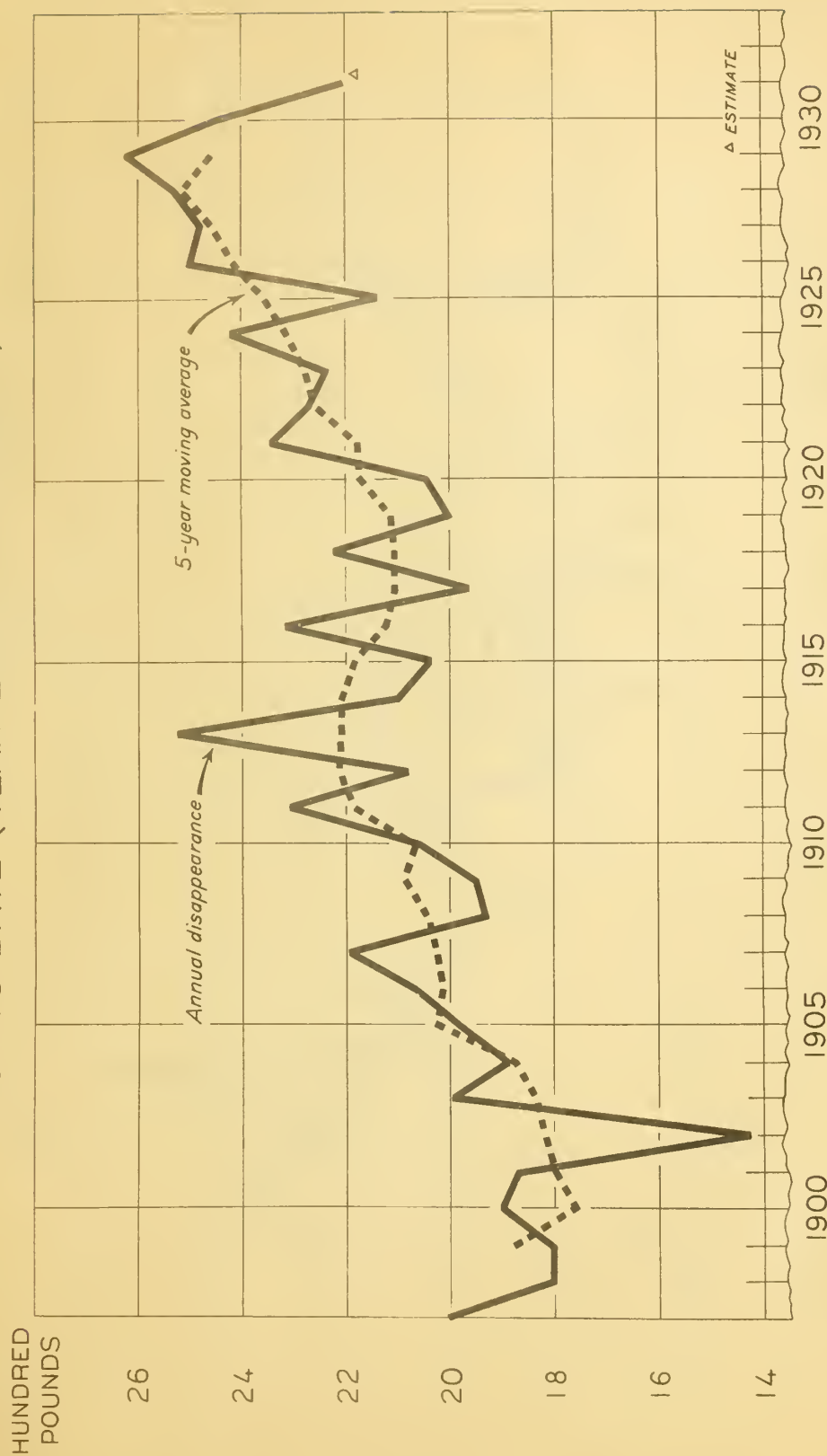
Table 6.- Beef steers: Average price per 100 pounds, Chicago, following years of short corn crops, by months, 1901-02, 1913-14, 1924-25 and 1930-31

Month	Period July through Dec. of following year			
	1901-02	1913-14	1924-25	1930-31
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
July	5.10	8.25	9.31	9.42
Aug.	5.10	8.30	9.53	9.48
Sept.	5.50	8.50	9.52	10.95
Oct.	5.45	8.40	9.57	10.64
Nov.	5.50	8.25	8.90	
Dec.	5.65	8.20	8.71	
Jan.	5.70	8.45	8.97	
Feb.	5.55	8.30	9.15	
Mar.	6.05	8.35	9.93	
Apr.	6.45	8.50	9.99	
May	6.60	8.40	9.90	
June	6.95	8.60	10.34	
July	7.10	8.80	11.28	
Aug.	7.05	9.10	11.10	
Sept.	6.65	9.35	11.04	
Oct.	6.20	9.05	10.80	
Nov.	5.20	8.60	10.16	
Dec.	4.80	8.35	9.72	

Division of Statistical and Historical Research. Prices 1901-02 and 1913-14 from Chicago Drovers Journal Yearbook; later prices from records of the Division of Livestock, Meats and Wool.

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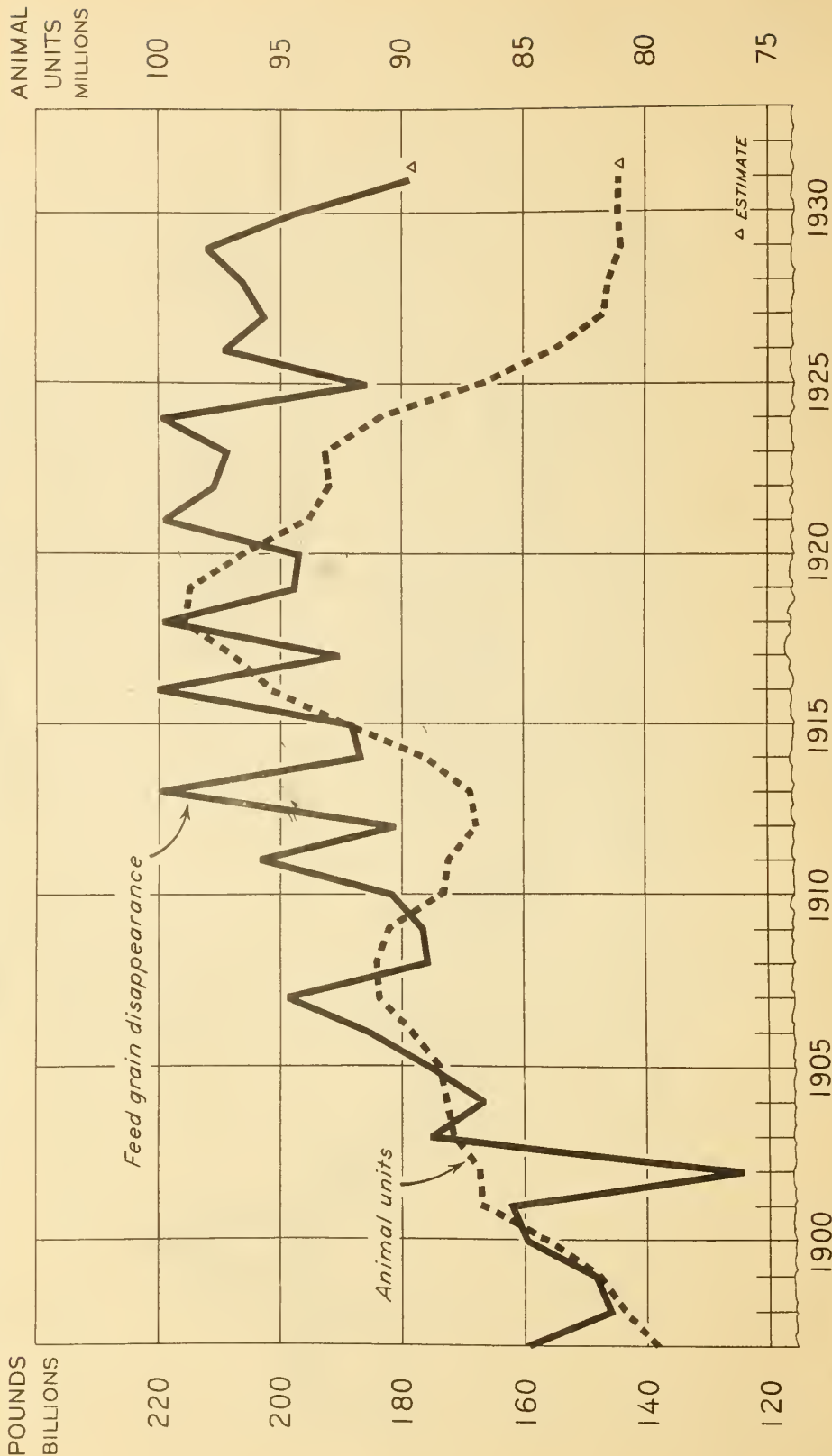
FEED GRAIN* DISAPPEARANCE PER ANIMAL UNIT 1897 TO DATE (YEAR ENDING OCTOBER)



*FEED GRAINS INCLUDE CORN, OATS, AND BARLEY

FIGURE 1

FEED GRAIN* DISAPPEARANCE AND NUMBER OF ANIMAL UNITS, 1897 TO DATE



* FEED GRAIN INCLUDES CORN, OATS, AND BARLEY

FIGURE 2

HAY DISAPPEARANCE PER ANIMAL UNIT (HAY-EATING ANIMALS) 1897 TO DATE (YEAR ENDING OCTOBER)

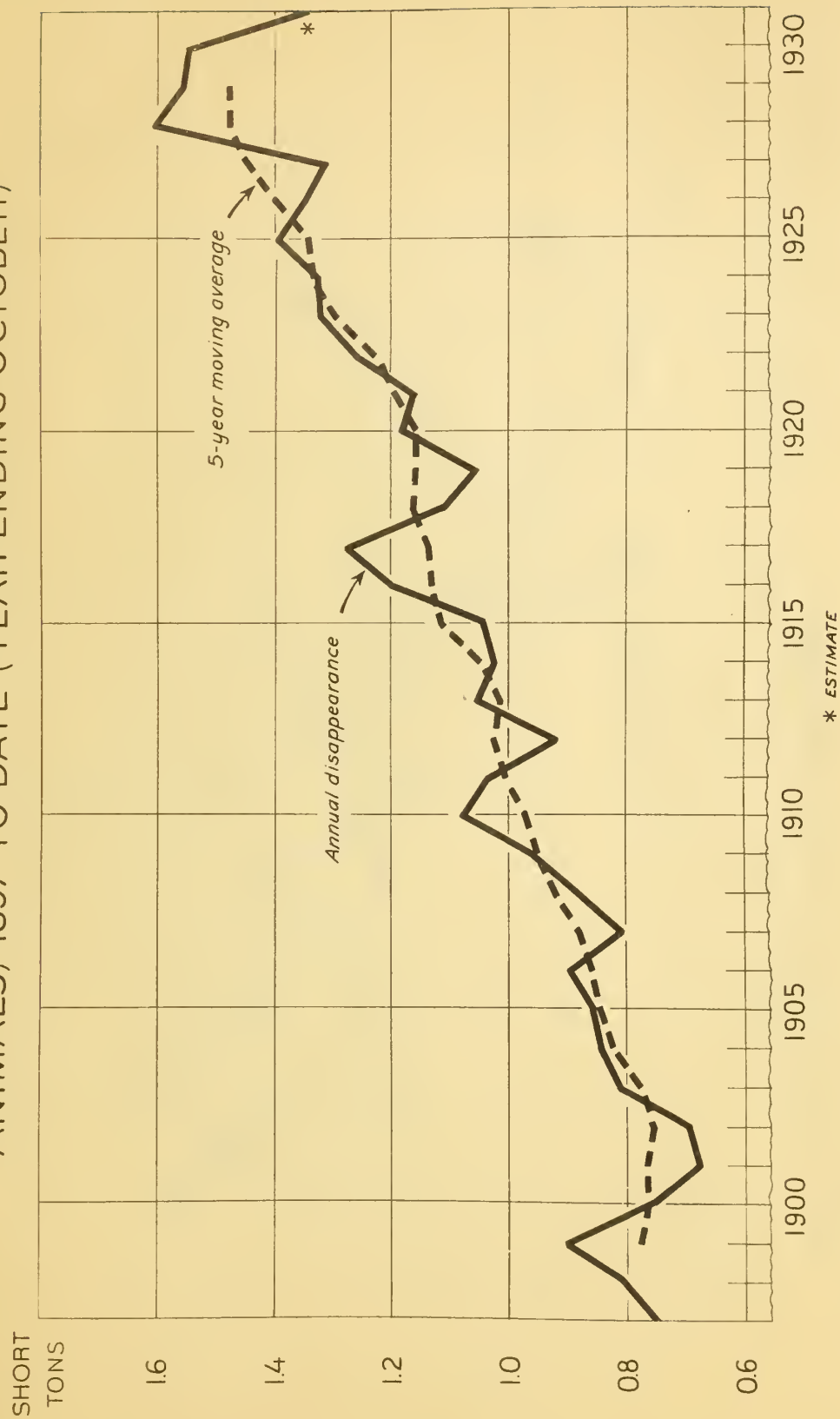
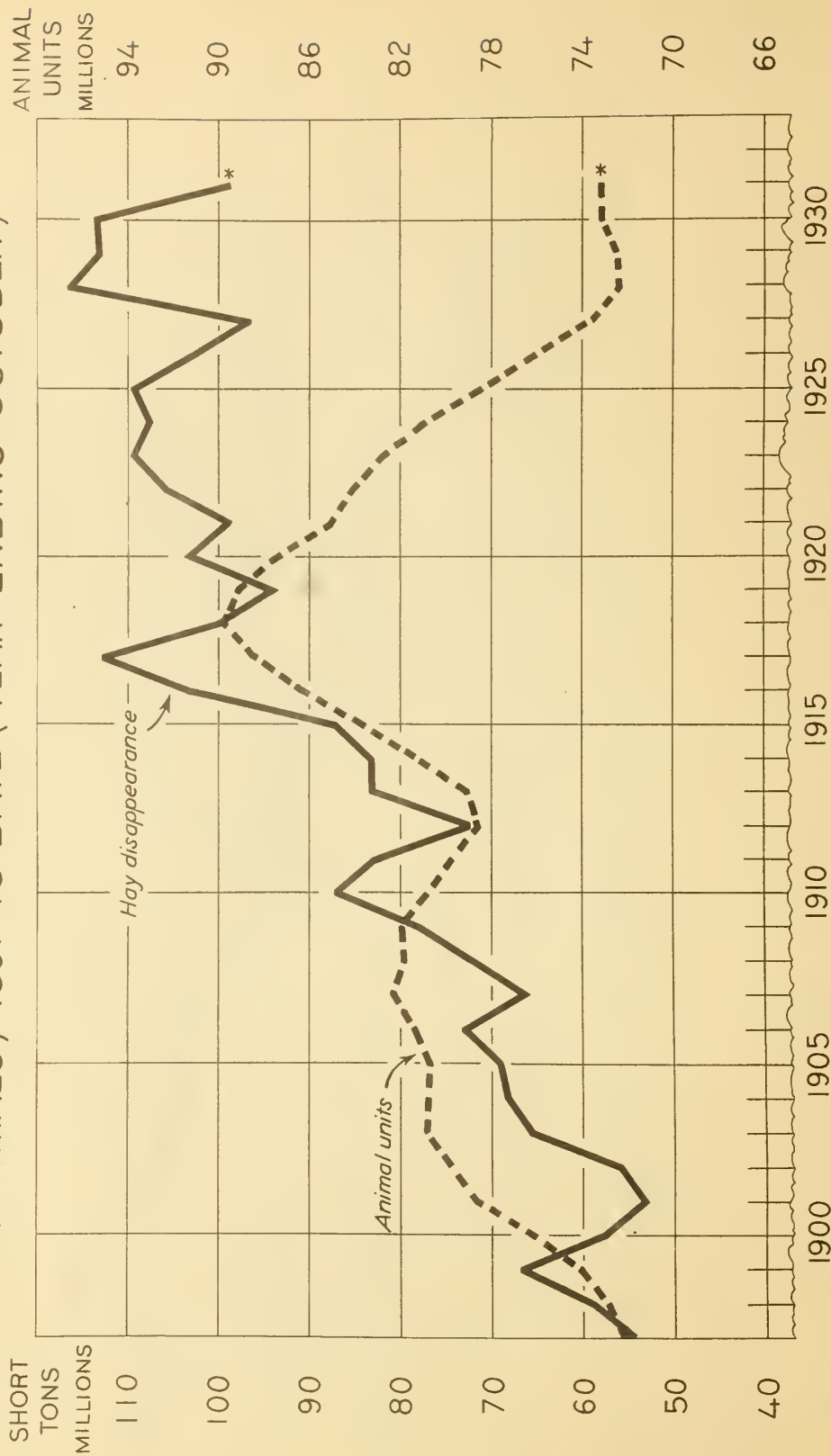


FIGURE 3

HAY DISAPPEARANCE AND NUMBER OF ANIMAL UNITS, (HAY-EATING ANIMALS) 1897 TO DATE (YEAR ENDING OCTOBER)



* ESTIMATE

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FIGURE 4

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BEEF STEERS: MONTHLY AVERAGE PRICE AT CHICAGO FOLLOWING YEARS OF SHORT CORN CROPS

